Understanding our estuaries

Anna Madarasz-Smith, a coastal ecologist and scientist at Pattle Delamore Partners explains why estuaries are now considered some of our most at-risk coastal environments.

As an interface between land and sea, estuaries are uniquely distinctive and dynamic environments. Providing accessible transport pathways, effective ways to remove waste, and safe, sheltered waters with plentiful food have made estuaries a focal point for human settlement.

They also host a unique array of plants and animals, that are specifically adapted to the challenges of periods of tidal inundation and exposure, and constant changes in salinity, temperature, and oxygen availability.

They are also the depositional endpoints for freshwater drainage networks, so are vulnerable to many of the same issues currently faced by freshwater in New Zealand. As a result, our estuaries are now considered some of the most at-risk coastal environments, with cumulative impacts threatening their ecological balance.

Despite these challenges, estuaries continue to play a critical role in protecting the sea from the land, and the land from the sea. They provide vital spawning and nursery areas for fish, and bird roosting, nesting and feeding. As productive systems, they enhance water quality, regulate water flows, promote gas exchange and can buffer the effects of storm surge. Intertidal vegetation also has some of the highest rates of carbon sequestration and storage.

So, given the ecological importance of estuaries and the valuable services they provide, why do we not hear more about estuaries when it comes to coastal management?

CATCHING UP WITH KNOWLEDGE

Our understanding of our estuarine and marine systems has lagged extensively behind that for freshwater.

Investment in freshwater monitoring has been in place for the best part of the last 30-40 years, while equivalent efforts in coastal and estuarine areas have only recently gained momentum. This disparity has led to a significant knowledge gap in our understanding of these critical coastal habitats.

There have, of course, been many studies or inventories that predate this, however, in terms of nationally consistent monitoring and understanding of our estuarine systems, this has lagged behind our freshwater counterpart.

Estuaries are complicated.

They can receive discharges from multiple, variable catchments, and water moves throughout the estuary in multiple and distinct ways – coming down from river systems, in from the tide and around the estuary dependant on current, tide and wind patterns.

Estuaries are highly variable in type, geographic location and range of freshwater/saltwater influence, and responses to ecological stressors can vary depending on these specific characteristics leading to a hesitancy to apply nationally consistent attribute states across the range of estuary types and locations.

This has meant that, for a number of years, management of estuarine environmental quality has been delayed.

Estuaries have also, at times, fallen through the policy gaps.

While the major stressors for most estuaries stem from the catchment land side, estuaries tend to fall within the Coastal Marine Area (CMA).

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This can mean that the system being managed (potentially under regional coastal plans) is disjointed from the planning documents that govern where many of the stressors come from (typically land-based management plans).

THE GOOD NEWS

However, the news is not all bad. Significant inroads have been made to cement our understanding of the effects we are having on estuaries – emboldened by the 2020 Parliamentary Commissioner for the Environment report 'Managing our estuaries'.

This report, dedicated scientific work to understand these challenges, and the associated changes to the National Policy Statement for Freshwater Management (2020) have highlighted the issues faced by estuaries as the downstream receiving environments for land-based activities and as the pinch points for coastal development and sea level rise and fall.

However, there is still a way to go. Effective estuarine management will require an integrated and holistic approach that considers the influence of multiple stressors and their interactions. By continued investment in monitoring, research and planning mechanisms we can work to maintain the integrity of these critical systems, safeguarding their role in both biodiversity and environmental quality for generations to come. **LG**